IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) An image correction apparatus comprising:

a lens distortion calculation unit which ~~calculates lens distortion correction information with respect to each zoom magnification, based on~~ acquires information on zoom magnifications contained in data of known images captured at respective different zoom magnifications, and calculates lens distortion correction information with respect to each zoom magnification; and

a ~~memory~~ storing unit which stores the lens distortion correction information in association with the zoom magnifications.

2. (Currently Amended) An image correction apparatus comprising:

a ~~memory~~ storing unit which contains lens distortion correction information in association with zoom magnifications of a lens;

~~a selector unit which selects lens distortion correction information corresponding to a zoom magnification employed at the time of capturing of an input captured image from the memory unit~~ a selection unit which acquires from data of an input captured image, information on a zoom magnification employed at the time of capturing of the captured image, and selects lens distortion correction information corresponding to the zoom magnification from the storing unit; and

a distortion correction unit which corrects distortion of the captured image ascribable to capturing based on the lens distortion correction information selected ~~in the selector unit~~.

3. (Currently Amended) The image correction apparatus according to claim 2, wherein

the ~~selector~~ selection unit selects from the ~~memory~~ storing unit a plurality of candidate pieces of lens distortion correction information in accordance with the zoom magnification employed at the time of capturing, and ~~corrects a sequence~~ correct a row of sample points forming a known shape in the captured image by using each of the plurality of pieces of lens

distortion correction information for error pre-evaluation, and thereby selects one piece of lens distortion correction information from among the plurality of pieces of lens distortion correction information.

4. (Currently Amended) An image correction apparatus comprising:

a lens distortion calculation unit which ~~calculates based on~~ acquires information on zoom magnifications contained in data of known images captured at respective different zoom magnifications, and calculates a lens distortion correction function for mapping points ~~on~~ in a lens-distorted image onto points ~~on~~ in an image having no lens distortion and a lens distortion function, ~~that is~~ or an approximate inverse function of the lens distortion correction function, with respect to each lens magnification; and

a ~~memory~~ storing unit which stores the pairs of lens distortion correction functions and lens distortion functions in association with the zoom magnifications.

5. (Currently Amended) An image correction apparatus comprising:

a ~~memory~~ storing unit which contains pairs of lens distortion correction functions for mapping points ~~on~~ in a lens-distorted image onto points ~~on~~ in an image having no lens distortion and lens distortion functions, that are approximate inverse functions of the lens distortion correction functions, in association with respective zoom magnifications of a lens;

~~a selector unit which selects the lens distortion function corresponding to a zoom magnification employed at the time of capturing of an input captured image from the memory unit~~ a selection unit which acquires from data of an input captured image, information on a zoom magnification employed at the time of capturing of the captured image, and selects from the storing unit the lens distortion function corresponding to the zoom magnification; and

a distortion correction unit which corrects distortion of the captured image ascribable to capturing based on the lens distortion function selected ~~in the selector unit~~.

6. (Original) The image correction apparatus according to claim 5, wherein

the selector unit selects from the memory unit a plurality of candidate lens distortion correction functions in accordance with the zoom magnification employed at the time of

capturing, and corrects a sequence of sample points forming a known shape in the captured image by using each of the plurality of lens distortion correction functions for error pre-evaluation, and thereby selects one of the plurality of lens distortion functions.

7. (Currently Amended) An image correction apparatus comprising:

a ~~memory~~ storing unit which contains lens distortion functions for mapping points ~~on~~ in an image having no lens distortion onto points in a lens-distorted image in association with respective zoom magnifications of a lens;

~~a selector unit which selects the lens distortion function corresponding to a zoom magnification employed at the time of capturing of an input captured image from the memory unit~~ a selection unit which acquires from data of an input captured image, information on a zoom magnification employed at the time of capturing of the captured image, and selects the lens distortion function corresponding to the zoom magnification from the storing unit;

a perspective distortion calculation unit which calculates a perspective distortion function for mapping points ~~on~~ in an image having no perspective distortion onto points on a perspective-distorted image, by using an image whose lens distortion is corrected by the lens distortion function selected; and

a distortion correction unit which corrects distortion of the captured image ascribable to capturing based on the perspective distortion function calculated by the perspective distortion calculation unit.

8. (Original) The image correction apparatus according to claim 7, wherein

the selector unit selects from the memory unit a plurality of candidate lens distortion correction functions in accordance with the zoom magnification employed at the time of capturing, and corrects a sequence of sample points forming a known shape in the captured image by using each of the plurality of lens distortion correction functions for error pre-evaluation, and thereby selects one of the plurality of lens distortion functions.

9. (Currently Amended) An image correction database creating method comprising:

acquiring information on zoom magnifications contained in data of known images captured at the respective different zoom magnifications, and calculating ~~based on known images captured at respective different zoom magnifications~~ a lens distortion correction function for mapping points on a lens-distorted image onto points on an image having no lens distortion and a lens distortion function, ~~that is~~ or an approximate inverse function of the lens distortion correction function, with respect to each lens magnification; and

registering the pairs of lens distortion correction functions and lens distortion functions into a database in association with the zoom magnifications.

10. (Currently Amended) An image correction method comprising:

consulting a database in which pairs of lens distortion correction functions for mapping points in a lens-distorted image onto points in an image having no lens distortion and lens distortion functions, that are approximate inverse functions of the lens distortion correction functions, are registered in association with respective zoom magnifications of a lens, ~~and selecting the lens distortion function corresponding to a zoom magnification employed at the time of capturing of an input captured image~~ acquiring from data of an input captured image, information on a zoom magnification employed at the time of capturing of the captured image, and selecting the lens distortion function corresponding to the zoom magnification; and

correcting distortion of the captured image ascribable to capturing based on the lens distortion function selected ~~in the selecting step~~.

11. (Original) The image correction method according to claim 10, wherein

the correcting of the distortion includes:

mapping a point in a target image having no distortion ascribable to capturing onto a point in a lens-distorted captured image by using the lens distortion function selected which was selected from the image correction database; and

determining a pixel value at the point in the target image by interpolating pixel values near the mapped point in the captured image.

12. (Original) The image correction method according to claim 10 or 11, wherein

the selecting of the lens distortion function includes: selecting a plurality of lens distortion correction functions as candidates in accordance with the zoom magnification employed at the time of capturing; correcting a row of sample points having a known shape in the captured image by each of the plurality of lens distortion correction functions for error pre-evaluation; and selecting one from among the plurality of lens distortion functions.

13. (Currently Amended) An image correction method comprising:

consulting a database in which lens distortion functions for mapping points in an image having no lens distortion onto points in a lens-distorted image are registered in association with respective zoom magnifications of a lens, and ~~selecting the lens distortion function corresponding to~~ acquiring from data of an input captured image, a zoom magnification employed at the time of capturing of ~~an input~~ the captured image and selecting the lens distortion function corresponding to the zoom magnification;

calculating a perspective distortion function for mapping points in an image having no perspective distortion onto points in a perspective-distorted image, by using an image whose lens distortion is corrected by the lens distortion function selected; and

correcting distortion of the captured image ascribable to capturing based on the perspective distortion function calculated.

14. (Original) The image correction method according to claim 13, wherein

the correcting of the distortion includes:

mapping a point in a target image having no distortion ascribable to capturing onto a point in a perspective-distorted captured image by using the perspective distortion function calculated; and

determining a pixel value at the point in the target image by interpolating pixel values near the mapped point in the captured image.

15. (Original) The image correction method according to claim 13 or 14, wherein

the selecting of the lens distortion function includes: selecting a plurality of lens distortion correction functions as candidates in accordance with the zoom magnification

employed at the time of capturing; correcting a row of sample points having a known shape in the captured image by each of the plurality of lens distortion correction functions for error pre-evaluation; and thereby selecting one from among the plurality of lens distortion functions.

16 - 24. (Cancelled)